The Effect of Hatcheries on Puget Sound Chinook, Hood Canal Summer Chum, and Coastal/Puget Sound Bull Trout

"Hatcheries of the future must be different from those of the past. There is both need and opportunity to make them better by ensuring that they are more consistent with ecological and genetic/evolutionary principles."

Conclusions of the Hatchery Scientific Review Group, 2004

The artificial propagation of salmon in Puget Sound began with a hatchery on the Baker River in 1896. Hatcheries were traditionally operated for two main purposes-to mitigate for the reduction of salmon runs due to the construction of dams and other habitat loss, and to increase the number of fish available for harvest.
The science and practice of hatchery operation has advanced significantly over the past 100 years, but hatchery intervention into salmon runs has created long term genetic and evolutionary consequences that may never be fully mended. Hatchery management today still seeks to provide opportunity for fishers where the negative consequences of artificial propagation can be minimized and isolated. Additionally, many hatchery programs are now utilized as tools to salvage the remaining salmon populations and help maintain them as they rebuild to self-sustaining and harvestable levels. Hatcheries alone cannot achieve this goal, and it is widely recognized that they must operate hand-in-hand with habitat restoration if future salmon are to find a home.

History of Hatchery Production in Puget Sound

Washington hatcheries are one of the largest producers of Chinook salmon in North America. The earliest hatcheries were not built specifically for Chinook propagation, but hatchery managers soon focused on that species. Early propagation entailed the collection of eggs, often by installing a weir in the river to impede upstream migration by adult Chinook, and releasing the hatched fry with little or no rearing. Hatchery managers rapidly learned that survival would increase by feeding and rearing the fry to a larger size for at least a few months. Experimentation with the release of larger juvenile salmon as sub-yearlings or yearling smolts led to the use of these long term rearing methods as the predominant strategy for Chinook hatchery production.

Puget Sound Hatchery Production

Hatchery releases in most Puget Sound rivers began near the turn of the 19th-20th centuries. Since 1935, WDFW and the tribes have released approximately 2.5 billion Chinook salmon into Puget Sound regional waters from hatchery programs (WDFW&PSTT, 2004). The juveniles released ranged from a month to over a year old.

Egg Transfers and the Development of Broodstocks

As hatchery production increased, hatchery managers began to utilize the "broodstock" from a few abundant watersheds to provide the eggs for an entire region. Between 1913 and 1927, Puget Sound hatcheries imported large numbers of Chinook salmon eggs from the lower Columbia River Basin. However the majority of Chinook salmon eggs for hatchery fall Chinook production in Puget Sound came from the Green River Hatchery. "From 1904-1913 and 1927-1957, releases from the Green river Hatchery averaged 69.9% and 67.7%, respectively, of all Chinook salmon releases" (WDFW & PSTT, 2004). Hatchery managers assumed that fish of the same species were interchangeable, and fish were transferred to watersheds without awareness of the impacts to genetic diversity and fish health. The portion of Chinook produced by the Green River Hatchery diminished after the 1950's, but transfers of Green River eggs to numerous Puget Sound rivers continued until

WRIA - Drainage	Years Planted with Chinook	Total Number Released (1950-1997)	Chinook released from WDFW Hatcheries, (1998-2003)	Chinook released from tribal Hatcheries (1998-2003)
WRIA 1 - Nooksack R. Samish R.	 1899-1929, 1952-present (1899) 1914-present	 161,197,000 198,347,000	 10,042,451 25,127,782	 10,663,202 –
WRIA 3 and 4 - **Skagit R.**	 1906-present	 88,368,000	 4,023,433	 –
WRIA 5 - Stillaguamish R.	 1905-15, 54, 57-present	 16,861,000	 1,069,135	 299,686
WRIA 7 - Snohomish R. Snoqualmie R. Skykomish R.	 1900-66, 89-93 1904-60, 63-75, 77 1904-51, 53-present	 2,729,000 74,077,000 1,457,000	 – – 7,629,732	 – – –
WRIA 8 - Lake Washington	 1920-present	 126,880,000	 12,715,542	 –
WRIA 9 – Duwamish/Green R.	 1909-present	 206,446,000	 27,951,428	 3,558,280
WRIA 10 - Puyallup R. White R.	 1917-present 1901-08, 1990-present	 2,480,000 87,477,000	 10,021,800 –	 2,600,586 5,314,045
WRIA 11 - Nisqually R.	 (1899-) 1937-present	 63,179,000	 –	 27,158,288
WRIA 16 - Skokomish R. Hamma Hamma R. Dosewallips R. Duckabush R.	 1899-1922, 1957(?) -present 1971-92 1959-92 1959-92	 5,734,000 4,175,000 117,730,000 3,745,000	 22,996,303 375,400 – –	 1,421,655 – – –
WRIA 17 - Big Quilcene R.	 1900-96	 27,733,000	 –	 –
WRIA 18 - Dungeness R. Elwha R.	 1902-82, 1996-present 1914 -?; 1953-present	 48,768,000 17,416,000	 9,293,796 18,514,493	 – –

Figure 3.29 Releases of Chinook salmon in watersheds with historical natural production in the Puget Sound. (WDFW & PSTT, 2004) Watersheds are identified by water resource inventory area (WRIA). Data are from WDFW annual reports (1902-1970), liberation summaries in Myers et al., 1998, personal communication from Kent Dimmit, WDFW, and Ken Currens, NWIFC.

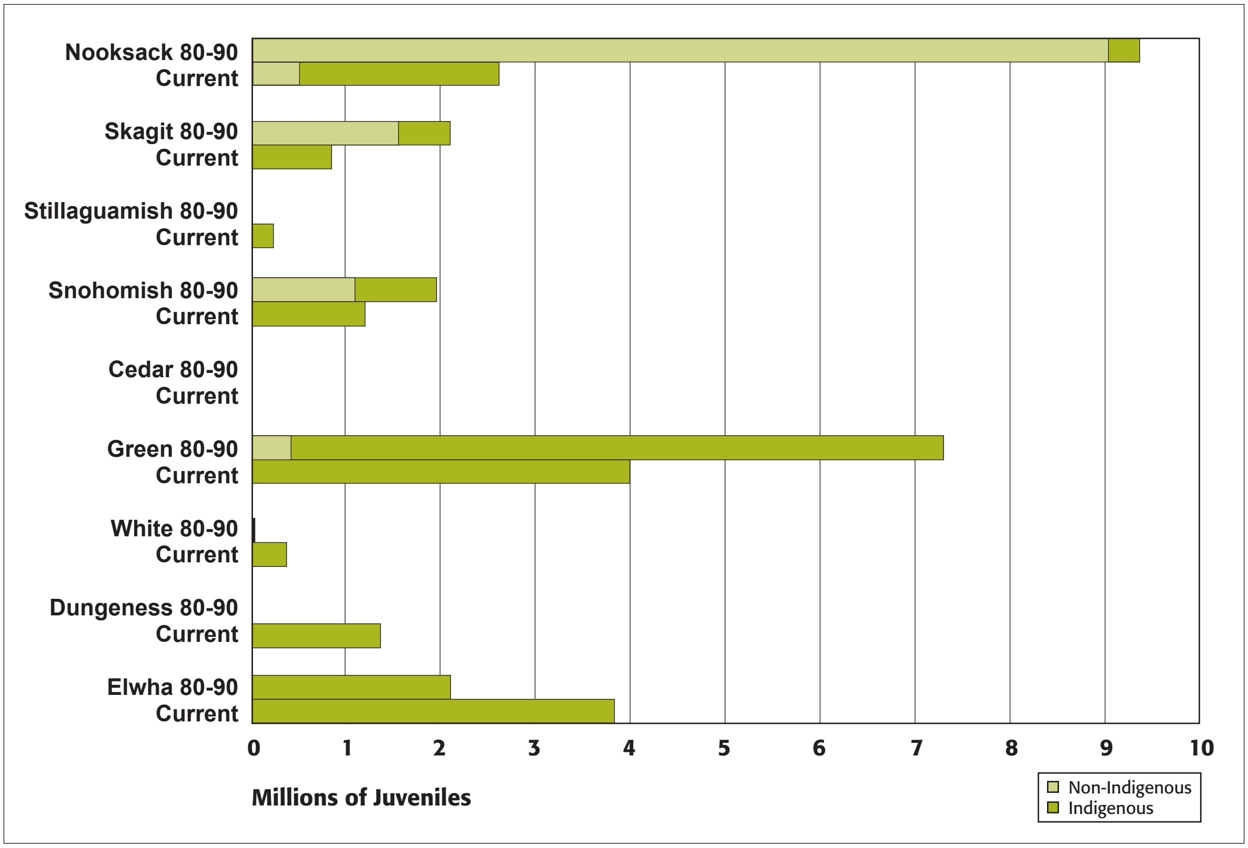

Figure 3.30 Current annual releases, and average annual releases, from 1980-1990 of non-indigenous and indigenous brood stocks in river systems with indigenous populations in the Puget Sound by WDFW and the tribes. Some river systems contain more than one indigenous population. Indigenous hatchery stocks in the Elwha, Dungeness, White, Stillaguamish, and Nooksack Rivers were identified by NMFS as essential for recovery.

the early 1990's. Two fundamental changes led to reforms in the late 1980s. As a result of the Puget Sound Salmon Management Plan, the co-managers developed the Co-managers' Salmon Disease Control Policy, which limited transfers of eggs to prevent spread of fish diseases, and in 1991 the co-managers developed the Wild Stock Restoration Initiative, which gave new emphasis to indigenous stocks. In recent years, indigenous stocks are being utilized as the broodstock for their home watersheds unless the local population is extinct.

U.S. v. Washington and the Puget Sound Salmon Management Plan

The affirmation of treaty Indian fishing rights in Washington added support to the concept of basing hatchery management on the production of fish from river-specific stocks. Tribes were legally bound to fish in designated "usual and accustomed fishing areas," thus they sought to build hatcheries and improve production where it would increase fishing opportunity in traditional fishing areas. Many of these areas had long been closed to fishing due to declining runs and interceptions by fisheries in the ocean and Puget Sound.

During legal arguments over the allocation of fish produced from hatcheries in the 1980's, the

Photo by K. Rawson.

The Bernie Kai-Kai Gobin Hatchery on the Tulalip Reservation.

court recognized the role of hatcheries in providing harvest opportunity:

The hatchery programs have served a mitigating function since their inception in 1895. (506 Supp. At 198.) They are designed essentially to replace natural fish lost to non-Indian degradation of the habitat and commercialization of the fishing industry. Id. Under these circumstances, it is only just to consider such replacement fish as subject to allocation. For the tribes to bear the full burden of the decline caused by the non-Indian neighbors without sharing the replacement achieved through the hatcheries, would be an inequity and inconsistent with the Treaty.

United States v. Washington,
759 f.2d 1353m 1360 (9th Cir) (en banc), cer. Denied, 474 U.S. 994 (1985)

United States v. Washington provides the legal structure for hatchery management in western Washington. The Puget Sound Salmon Management Plan (PSSMP) was entered as a court-ordered agreement in 1985 between state and tribal co-managers to provide the framework for

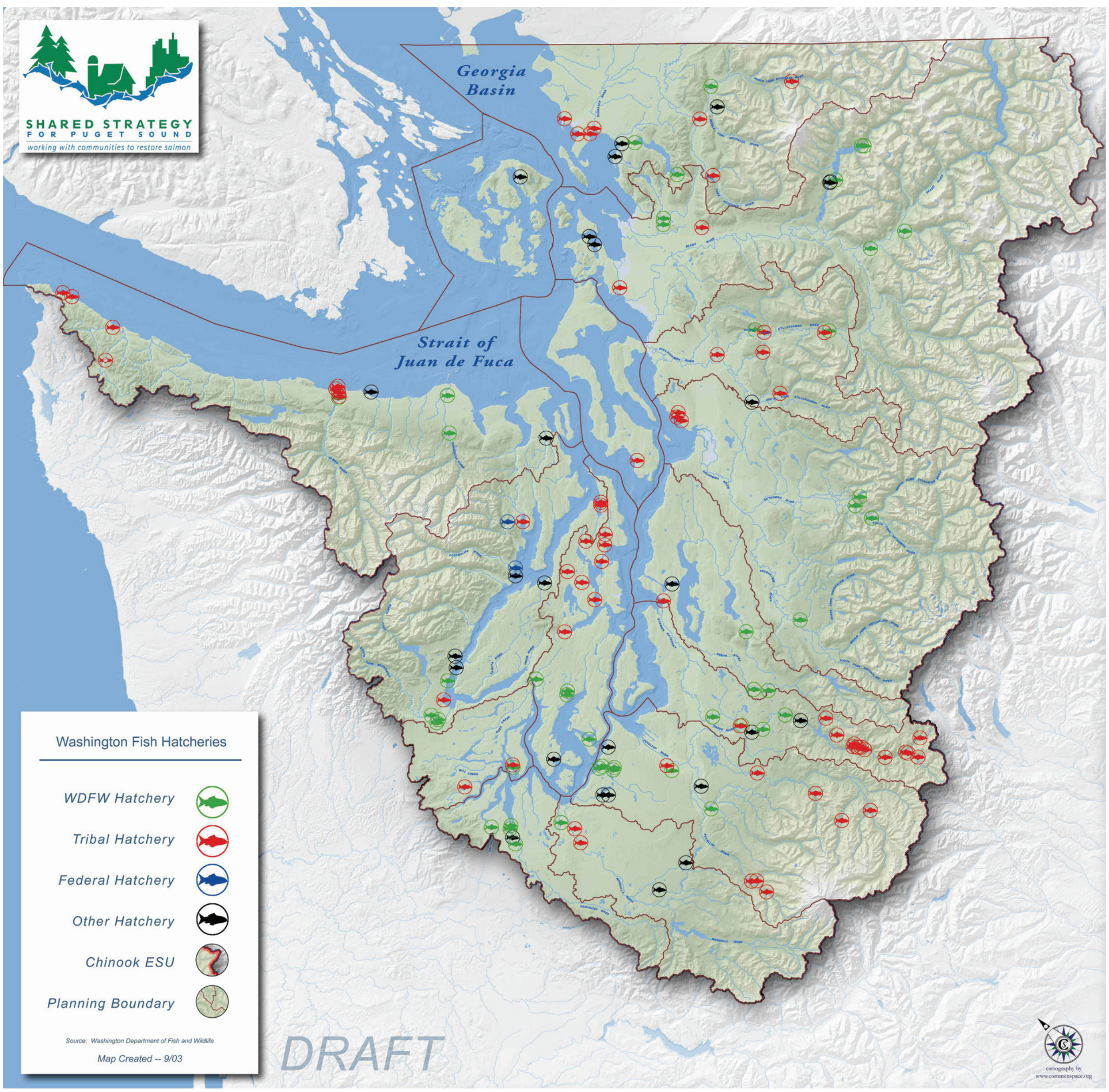

Figure 3.31 Hatchery locations in the Shared Strategy Planning Area.

the operation of hatchery programs and harvest opportunities. The PSSMP defines harvest management procedures and the basis for artificial production objectives and levels of production. Within the framework of the PSSMP, co-managers have prepared documents to describe facilities; species cultured; the source of broodstock; hatchery practices including transfers, rearing, and release; production goals and contingency plans. An annual forum is held to discuss and coordinate proposed program changes between the co-managers and other affected parties. Production changes or closures due to budget constraints may have disproportionate effects on various fisheries harvest opportunities, and continue to be the subject of discussion between the co-management entities.

Negotiations to prepare plans designating annual production levels, locations and broodstock use have continued to be based on the Puget Sound Salmon Management Plan since the 1980s. Co-managers have coordinated the implementation of the PSSMP with the recent review of hatchery operations in Washington by the Hatchery Scientific Review Group and with recovery planning under the Endangered Species Act

The Use of Hatcheries for Conservation and Recovery

Hatchery programs initiated to help wild stocks recover are managed to minimize adverse genetic and fish health effects which can be associated with long-term hatchery programs. Most conservation programs are considered to be drastic temporary measures, implemented as genetic life-support systems until habitat can be recovered sufficiently to support the indigenous population without intervention.

In the late 1970s and 1980s, the decline of several important wild stocks of Chinook salmon was so apparent that fisheries managers proposed using hatcheries to prevent their extinction.

"In the White River, for example, annual returns of 5,000 spring Chinook salmon had declined into the teens. In 1977, WDFW began an intensive captive/gene banking hatchery program to maintain these fish before they became extinct. Programs for other populations soon followed for Chinook salmon in the Nooksack, Elwha, Stillaguamish and Dungeness Rivers. Currently, approximately one-third of hatchery programs statewide focus on maintaining and rebuilding wild salmon runs." (WDFW & PSTT, 2004)

Due to the critical status of Hood Canal summer chum salmon populations, supplementation programs were implemented by WDFW, Puget Sound tribes, volunteer groups and USFWS in several eastern Strait of Juan de Fuca and Hood Canal rivers. The use of hatchery supplementation programs is an integral part of the Summer Chum Salmon Conservation Initiative (WDFW, Point No Point Treaty Tribes, 2000).

"With the loss of so many populations prior to our knowledge of stock structure, the historic richness of the salmon and steelhead resource of the West Coast will never be known. However, it is clear that what has survived is a small proportion of what once existed, and what remains is substantially at risk."

Williams, Nehlson et al.
as quoted by NRC, 1996

Photo by Scott Chitwood, courtesy of the Jamestown S'Klallam Tribe.

WDFW Dungeness hatchery staff working with Chinook for the captive broodstock program.

Hatchery Hazards and Risks

Concerns over the artificial propagation of salmon date back at least 150 years to the early days of salmon culture, when a Scottish critic calling himself "Salmo" harangued hatchery proponents as, "men of tanks and incubators... and feeble drivellers who have voted [the salmon] incompetent to discharge the functions which constitute the chief end and object of her existence." (Lichatowich, 1999) The advocates of hatcheries in the Pacific Northwest in the late 19th century were highly optimistic about the potential contribution hatcheries could make to Northwest rivers, but recognized that the successful transplant of salmon to other streams would require similar river conditions and careful management.

Although hatcheries have significant roles in recovering species and providing harvest opportunity, unless they are carefully managed a number of potential hazards stem from their operation (Busack and Currens, 1995):

- Long lasting changes to the genetic composition of salmon populations may occur due to the large numbers of hatchery fish that are released, altering the proportion and flow of genes among wild populations.
- Hatchery programs may lead to domestication by unintentionally or intentionally selecting for physical traits and behaviors that improve the chance of fish surviving in the hatchery environment. These characteristics have the potential to lower the fitness of salmon populations to survive and reproduce successfully in the wild.
- The physical layout and management of hatchery facilities themselves may create adverse effects through the removal of stream flow, placement of structures in the flood plain and the emission of effluent.
- Ecological effects occur when hatchery fish compete with naturally-spawned populations for territory and food, or when other hatchery-produced species prey upon threatened populations.
- The risk of disease is elevated in the highly dense hatchery environment, and can spread to wild populations.
- Hatchery production may increase the risk of overharvest of wild fish if harvest regimes target areas where the threatened populations are mixed in with hatchery runs, unless these fisheries are carefully managed for the needs of wild fish.

Loss of Population Identity

Natural populations of salmon are negatively affected by "gene flow," the transfer of genes from hatchery populations to natural ones. Recent studies have indicated that the greater the amount of gene flow and the dissimilarity between the hatchery and wild fish populations in a given watershed, the greater the negative genetic effects. Gene flow can cause a loss in unique identity and traits among natural populations of salmon, and within individual populations that receive hatchery fish.

The reduction in diversity among natural populations can result where a single hatchery stock is propagated over a wide area, such as the common practice of using Green River Chinook eggs for many decades in Puget Sound.

"Mass transfers of salmon between rivers disrupted thousands of years of reproductive isolation and destroyed the adaptive relationship between the salmon and their home stream. The newly hatched fry, deposited in rivers distant from their natal stream, had to face a new set of survival challenges that were not part of their evolutionary legacy. The advantages of local adaptation were lost..." *(Lichatowich, 1999)*

Similarly, changes in diversity can occur within individual populations receiving hatchery fish. "A reduction in diversity and the effective size of the wild population can result from 'genetic swamping,' where a large number of hatchery fish from relatively few parents interbreed with wild fish," (HSRG, 2004).

The loss of genetic diversity may result in a decrease of the viability of a local salmon population in two ways: 1) Loss of adaptation may occur when genes that evolved in a non-local environment replace those that were locally adapted; and 2) hybridization results in recombinations of sets of genes that were favorable to a local population, leading to loss of individual performance and population productivity that may not show up for a generation or more.

Loss of Fitness

Loss of fitness can occur because of domestication, which is the change in the genetic composition of a population as a result of selection for an artificial, captive environment (Busack and Currens, 1995). Fish rearing in a hatchery for all or a portion of their life experience very different environments than fish living in the wild. Fish with genetic traits that allow them to perform well in the wild may not survive as well in hatchery environments. Conversely, fish with genetic traits that allow them to survive better in the hatchery environments often perform more poorly in the wild. Hatchery environments tend to select for fish that do well in the hatchery environment.

Because hatcheries can successfully produce large numbers of fish, this can change the overall genetic composition of the population. Over time, if fish adapted to the hatchery return to spawn in the wild or natural-origin fish are used to produce fish in the hatchery, the population is forced to adapt to two different environments, which lowers the overall performance or fitness of the population.

Effects of Hatchery Facilities

Most hatcheries withdraw water from segments of a stream as the water passes through the hatchery facilities and is then returned further downstream. In some cases, diminished flow can be severe enough to affect migration and spawning behavior. Injuries and mortalities can occur at the screens where water is withdrawn. Hatchery effluent can change water temperatures as well as other chemical and nutrient levels.

Hatcheries that are utilized to incubate or rear threatened populations also present special risks, as the concentration of a large number of these precious eggs in a single "basket" raises the possibility of a catastrophic loss if equipment breaks down or water lines freeze. Restoration hatchery programs also run the risk of "mining" the broodstock population if they are unable to produce as many successful returning spawners as the remaining wild component of the population. Recent plans and reform initiatives have identified a number of potentially adverse impacts at Puget Sound hatcheries. Specific recommendations and actions to upgrade hatchery facilities and operations to reduce the risk to threatened populations have been incorporated into Hatchery Genetic Management Plans and local watershed plans, and implementation has commenced in many locations.

Ecological Effects

Ecological effects of hatchery fish include predation and competition for food and space. Hatchery-origin fish may prey upon juvenile wild Chinook in freshwater and estuarine areas, or compete for limited food supplies and territory. A large mass of migrating hatchery fish may also attract concentrations of birds, fish and seals, which contribute to predation on wild populations as well. A number of procedural changes have been incorporated by the co-managers in the operation of hatchery programs to minimize the risks to threatened populations, including alterations in the number, timing and location of releases of hatchery-produced fish.

Potential threats to Hood Canal summer chum salmon from negative interactions with hatchery fish (late-timed Chinook, coho, pink, and fall chum salmon) through predation, competition, behavior modification or disease transfer were identified by the NMFS Chum Biological Review Team (2003). However, NMFS indicated that specific mitigation measures for hatchery programs which presented a risk to summer chum had been identified and largely implemented by 2000. Continued evaluation and reporting on hatchery threats to summer chum is conducted by WDFW and the Point No Point Treaty Tribes through the Summer Chum Conservation Initiative (WDFW, PNPTT; 2000 and updates).

Disease Transfer

Although the pathogens responsible for fish diseases are present in both hatchery and natural populations, hatchery-origin fish may have an increased risk of carrying fish disease pathogens because the higher densities of rearing in the hatchery may stress fish and lower immune responses. A salmonid disease control policy was adopted by Puget Sound co-managers in 1998 to specify minimum fish health standards and conditions and procedures for egg and fish transfers, health inspection and communication (NWIFC & WDFW, 1998). The disease control policy emphasizes the importance of assessing the pathogen history of the fish, water supply and watershed prior to release or transfers.

Hatchery Production and Harvest Management

The presence of large numbers of hatchery-produced fish in ocean and Puget Sound fisheries

Tribal and WDFW staff check carcasses for coded-wire tags at the Samish Hatchery. Photo by S. Young

is thought to have exacerbated the risk to threatened populations in the past, due to the harvest of mixed populations of wild and hatchery fish. Naturally-spawning populations, many of which are low in abundance and productivity, are mixed in with populations from other river systems and with hatchery fish, and may be overfished where harvest rates were set high enough to take advantage of the hatchery production. However, current harvest management plans carefully control these mixed stock fisheries for the needs of wild fish. Additionally, managers use tools, such as time-and-area management and mark-selective fisheries to concentrate harvest on fish produced by hatcheries without exceeding allowable harvest rates for wild fish. As a result, some recreational and net fisheries have been maintained while harvest rates on most wild Chinook stock have been greatly reduced over the past 10 years (see Figure 3.32).

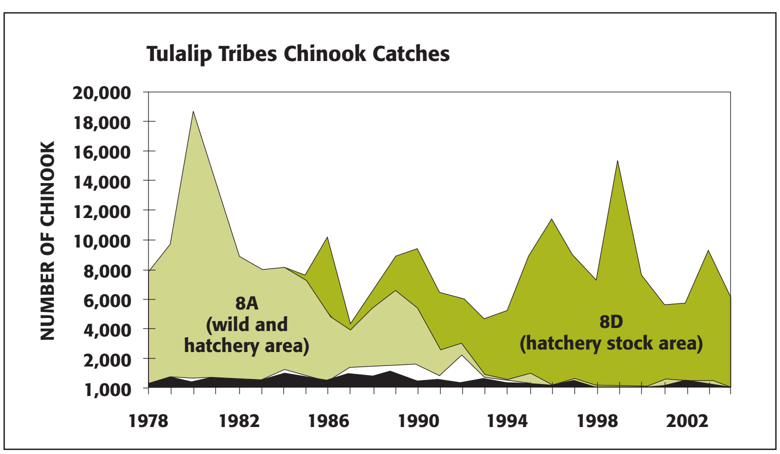

Figure 3.32 Graph showing the shift in the Tulalip Tribes chinook harvest from a mixed-stock area to a smaller area dominated by hatchery fish. By moving the fishery to a smaller area, the fishery has maintained overall harvest levels while reducing the rate of harvest on wild fish from approximately 50% to 5% (Source: Tulalip Tribes).

Until the development of "coded-wire-tags" in the 1970's, fisheries managers lacked tools to assess the fate of fish once they left the hatchery. The coded tags, 1 mm in length, are inserted into the nose of juvenile salmon prior to release. Tags are recovered from fish harvested in commercial and sport fisheries as well as the carcasses of adults that have spawned in natural areas or at hatcheries. The tags help managers obtain data on specific populations, providing clues to the proportional relationship between hatchery and natural origin fish and where, when and how the fish are caught.

Hatchery Threats to Bull Trout

Bull trout have not been extensively cultured in any part of the species' range, thus limiting the potential genetic and biological risks associated with hatcheries. Extensive supplementation programs are not considered to be necessary, and the potential use of hatcheries has generally been limited to genetic reserves and restoration restocking in watersheds where a population has been extirpated. The operation of hatchery facilities such as weirs and water intakes may have some impacts to bull trout, and correction of these threats is intended to be integrated with other hatchery reform efforts (USFWS, 2004). Although the interaction of hatchery species of salmon, steelhead or cutthroat trout with bull trout are cited as a potential threat, it is unclear whether these species serve primarily as prey for the bull trout, or whether they increase competitive pressure.

Hatchery Reform

Although fish rearing practices have continually improved in hatcheries over the last 100 years because of advancements in science, the development of the Puget Sound Salmon Management Plan in 1985 provided support to fundamentally change the direction of hatchery operations in Washington State. Tribal and state co-managers developed and implemented several important production guidelines and policies, including guidelines for fish transfers and spawning operations to minimize genetic loss, a salmonid disease control policy which limited the exchange of fish among watersheds to help prevent the spread of fish pathogens, and broodstock spawning protocols. Hatchery managers in the 1990s were also required to prepare detailed operations plans and complete permit requirements under the National Pollution Discharge Elimination System for producing healthy hatchery salmon populations and minimizing their effects on wild salmon. The Wild Stock Restoration Initiative began in 1991 with a comprehensive assessment of the status of local salmon and steelhead stocks by the co-managers, known as the Salmon and Steelhead Stock Inventory (WDF et al., 1993) which continues to be updated on a regular basis. Further efforts by the co-managers have included an assessment of management practices and proposed changes, and the development of the Wild Salmonid Policy (WDFW, 1997).

More recently, efforts toward hatchery reform related to threatened species have occurred on two interrelated tracks. The Hatchery Scientific Review Group, an independent panel of scientists, was convened by the US Congress to evaluate Puget Sound hatcheries; and the State of Washington and Puget Sound Treaty Tribes have prepared comprehensive Chinook resource management plans for harvest and hatchery management in response to the status of the Chinook populations and the requirements of the Endangered Species Act.

Hatchery Scientific Review Group

In 1999 the US Congress convened an independent panel of scientists called the Hatchery Scientific Review Group (HSRG) to evaluate Puget Sound hatcheries and provide recommendations for how hatcheries can accomplish two objectives:

1) Conserve naturally spawning salmon and steelhead populations; and
2) Support sustainable fisheries.

The evaluation process occurred from 2000 to 2003 and a written report, *Hatchery Reform: Principles and Recommendations*, was issued by the HSRG in 2004. In addition to the two primary objectives, the hatchery reform project was required to consider the relationship of artificial production programs to several legal mandates, including:

- Treaty fishing rights and co-management status of Puget Sound Indian tribes;
- The US/Canada Salmon Treaty;
- Applicable laws and responsibilities of the State of Washington; and
- The US Endangered Species Act.

The Hatchery Scientific Review Group issued a number of system-wide recommendations for hatchery reform, along with approximately 1,000 program-specific recommendations across the region. These conclusions and recommendations may be viewed at www.hatcheryreform.org. The HSRG also noted that a number of successful hatchery programs are already operational, which are helping to recover and conserve naturally spawning populations, supporting sustainable fisheries, and/or providing other benefits such as education.

In addition to the scientific evaluation process, the US Congress appropriated funding for related research grants, implementation of early action reform projects, and designated Long Live the Kings (a private, non-profit organization) as the facilitation and communications team for the project. The HSRG and regional co-managers are continuing to work on monitoring and evaluation programs.

Comprehensive Chinook Salmon Resource Management Plan: Hatchery Component

The draft hatchery component of the Puget Sound Comprehensive Chinook Salmon Resource Management Plan was jointly developed by the Washington Department of Fish and Wildlife and the Puget Sound treaty tribes as part of the Wild Stock Restoration Initiative and completed in 2004. In response to ESA, it expands the biological assessment of tribal hatchery programs submitted by the Bureau of Indian Affairs as a requirement of Section 7 of the Endangered Species Act to all state and tribal hatcheries. It also incorporates management alternatives developed by the tribes and the National Marine Fisheries Service, and draws from the recommendations of the Hatchery Scientific Review Group.

Several general principles guide the plan, including the following:

- Hatchery programs need to assess and manage the ecological and genetic risks to natural populations.
- Hatchery programs need to coordinate with fishery management programs to maximize benefits and minimize biological risks so that they do not compromise overall plans to conserve populations.
- Hatchery programs need protocols to manage risks associated with fish health, broodstock collection, spawning, rearing, and release of juveniles; disposition of adults; and catastrophes within the hatchery.

Benefits and risks from each artificial production program for Chinook salmon in Puget Sound were evaluated in multiple ways, resulting in a number of improvements and commitments to Chinook salmon programs in the region. The plan emphasizes the use of indigenous broodstock, the reduction of egg and juvenile transfers between watersheds, the timing and location of hatchery releases to avoid competition and predation, and a process of adaptive management. The plan also calls for a number of net pen and other production programs to be terminated or reduced. State-of-the-art fish health monitoring, facility disinfecting and disease management procedures are established for the operation of Puget Sound hatcheries. Specific facilities upgrades for screening, rearing or incubation are identified in some cases. The plan also calls for a number of research, monitoring and evaluation programs to mark fish and to determine the effects of competition and predation between hatchery and natural fish.

The specific details for each hatchery program are contained in 42 Hatchery Genetic and Management Plans developed by state and tribal fisheries managers. A Draft Environmental Impact Statement for the implementation of the hatchery component of the Comprehensive Puget Sound Chinook Management Plan is presently in process and is expected to be released in the summer of 2005.

NMFS Policy on the Consideration of Hatchery-Origin Fish in ESA Listing Determinations of Pacific Salmon

On June 3, 2004, the National Marine Fisheries Service issued a proposed policy to address the role of hatchery produced Pacific salmon in listing determinations under the Endangered Species Act (ESA) (69 FR 31354-31359). This policy superseded an interim policy on the artificial propagation of salmon under the ESA that was issued in 1993. In the past, NMFS had focused on whether the naturally spawned fish are, by themselves, self-sustaining in their natural ecosystems when making listing determinations. Generally NMFS did not explicitly consider the contribution of hatchery fish to the viability of threatened populations of salmon, and the potential that the hatchery fish could reduce the risk of extinction. A 2001 decision by the U.S. District Court in Alsea Valley Alliance v. Evans, 161 F. Supp. 2ad 1154 (D. Or. 2001) led to changes in how NMFS considered hatchery fish in population viability and extinction risk assessments. In that ruling, U.S. District Judge Michael Hogan found that the ESA listing for the Oregon Coastal coho salmon Evolutionarily Significant Unit (ESU) was invalid because the federal government did not take into account genetically similar hatchery fish with wild coastal coho in determining listing status. Judge Hogan did not determine how hatchery fish should be taken into consideration, but he did hold that they must be considered.

Following a review of other artificial propagation policies under the Endangered Species Act, NMFS agreed that artificial propagation may play a supportive role in the conservation and recovery of listed species. However, they also indicated that artificial propagation is not a substitute for addressing factors responsible for a species' decline, and the recovery of wild populations in their natural habitat is their first priority. Additionally, they highlighted the genetic and ecological risks that may be associated with artificial propagation, and which must be considered in recovery planning.

In response to the Alsea Valley Alliance v. Evans decision, and consistent with the conservation requirements of the Endangered Species Act, NMFS completed a proposed "Hatchery Listing Policy" describing how the agency will consider hatchery fish in all future ESA listing determinations for Pacific salmon. The policy was subsequently applied in 2004 in an updated species status review process for all listed salmon evolutionarily significant units in the Pacific Northwest and California. The proposed policy contains five points:

- NMFS recognized that genetic resources that represent the ecological and genetic diversity of a salmon species can be found in hatchery fish as well as fish spawned in the wild.
- NMFS delineated a process for determining which populations are included in an Evolutionarily Significant Unit. Additionally they defined the standards for determining how closely natural and hatchery populations are genetically related, to serve as a threshold in deciding whether or not the hatchery stocks should be considered as part of the Evolutionarily Significant Unit.
- NMFS stated that determinations for Pacific salmon ESUs will be based on the entire ESU (including natural, and where appropriate hatchery-origin salmon) but recognized the necessity of conserving natural populations and their habitat.
- A process for making status determinations was described based on the concept of viable salmon population parameters.
- The policy recognized the role of hatcheries in fulfilling trust and treaty obligations with respect to salmon harvest.